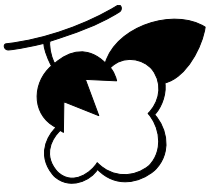
Invention Reduces Cotton Bale Packaging Forces



A tiny cotton boll harvested from a field ends up in a 500-pound bale that is shipped to textile mills or traded on the world market. At first glance, the soft fiber may appear delicate, but it actually endures a lot of pressure before making its way into a comfy pillow or familiar sweater.

At the gin, fiber is separated from the seed and cleaned. Then it's sent to a bale press, which compresses loose cotton into compact, dense bales. "Each bale is subjected to more than 800,000 pounds of force," says agricultural engineer W. Stanley Anthony. Research leader of ARS' U.S. Cotton Ginning Research Laboratory, in Stoneville, Mississippi, Anthony developed and patented a device that reduces bale packaging forces and should ultimately reduce cotton bale packaging costs.

After cotton is pressed, six or eight metal or plastic bands or wires, called bale ties, are wrapped around the bale to keep it intact for shipping and handling. If packaging is done incorrectly, some bale ties may break.

About 800,000 of the 15 to 20 million U.S. cotton bales produced annually require bale-tie repairs, costing producers up to $35 per bale. Repair costs increase the cost of the final consumer product. Anthony's device reduces the force needed to compress cotton bales to 500,000 pounds. "This allows bales to be compressed to proper densities, thereby reducing subsequent repairs, which saves producers time and money," says Anthony.

"This technology should also reduce energy costs associated with the bale press by 35 percent," he says, "since electricity powers the hydraulic motors and pumps that compress these bales."

Anthony's device can be incorporated into a gin's existing equipment without costing a substantial amount. Components of the new bale press, like cylinders, pumps, and motors, can be smaller than existing equipment, which should reduce the $300,000 initial cost typically required for the press.

"This invention can also be used in other industries that use compression of loose materials—such as plastics, paper, cardboard boxes, and synthetic fibers—into dense packages for shipping and handling," says Anthony. Three commercial firms have licensed this invention for manufacturing and distribution.—By **Tara Weaver-Missick,** ARS.

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Bone Gains Fade When Elders Cease Supplements

A few years ago, researchers at the Jean Mayer USDA Human Nutrition Research Center on Aging, at Tufts University in Boston, Massachusetts, showed that healthy men and women over 65 could benefit from taking calcium and vitamin D supplements. Half of the study volunteers took an extra 500 milligrams of calcium and 700 international units (IU) of vitamin D daily for 3 years. These volunteers either gained or retained bone in the spine, hip, and throughout the body, compared to those who got a placebo.

But would that benefit last if the supplements were discontinued? That's what study leader Bess Dawson-Hughes and colleagues set out to learn. And 295 of the original 389 volunteers agreed to help her. They no longer took calcium and vitamin D provided by the study—although, for ethical reasons, they were allowed to take their own supplements. And they returned to the center once a year for 2 years for bone measurements and other tests.

Unfortunately, the bone benefits didn't last. By the end of 2 years, "no supplement-related benefits to spine or hip remained—either in bone mineral density or bone turnover," says Dawson-Hughes. She noted that the male volunteers retained some of the benefit to whole-body bone mineral density, but she can only speculate as to why.

She says the findings have broad implications. Fewer than 1 in 10 U.S. elders over age 65 meet the current recommendations for calcium and vitamin D. These amount to a total daily intake of 1,200 milligrams of calcium from food and supplements and 400 to 600 IU of vitamin D.

Close to two-thirds of the women and about half the men chose to take some supplemental calcium during the 2-year follow-up. Vitamin D use was a little lower: About one-half to two-thirds of the women and more than one-third of the men took some supplemental vitamin D. But the self-selected supplements "had no impact on the results," says Dawson-Hughes, "perhaps because the amounts taken were less than half the study levels and perhaps because use was not regular."

Based on these findings, she and her colleagues concluded that men and women age 65 and older should try to meet the current recommended calcium and vitamin D intakes on a continuous basis.—By **Judy McBride,** ARS.

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